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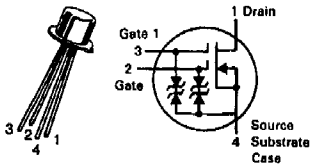
3N204
3N205

TO-72



DUAL-GATE MOSFET

N-CHANNEL — DEPLETION

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	25	Vdc
Drain-Gate Voltage	V_{DG}	30	Vdc
Drain Current	I_D	50	mA
Reverse Gate Current	I_G	−10	mA
Forward Gate Current	I_{GF}	10	mA
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	360 2.4	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.2 0.8	mW mW/°C
Lead Temperature	T_L	300	°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65°C to +175°C	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage (I_D = 10 μA, V_{G1} = V_{G2} = −6.0 V)		$V_{(BR)DSX}$	25	—	Vdc
Gate 1-Source Breakdown Voltage (I_{G1} = ±10 mA) Note 1		$V_{(BR)G1SO}$	±6	±30	Vdc
Gate 2-Source Breakdown Voltage (I_{G2} = ±10 mA) Note 1		$V_{(BR)G2SO}$	±6	±30	Vdc
Gate 1 Leakage Current (V_{G1S} = ±5.0 V, V_{G2S} = V_{DS} = 0)		I_{G1SS}	—	±10	nA
Gate 2 Leakage Current (V_{G2S} = ±5.0 V, V_{G1S} = V_{DS} = 0)		I_{G2SS}	—	±10	nA
Gate 1 to Source Cutoff Voltage (V_{DS} = 15 V, V_{G2S} = 4.0 V, I_D = 20 μA)		$V_{G1S(off)}$	−0.6	−4.0	Vdc
Gate 2 to Source Cutoff Voltage (V_{DS} = 15 V, V_{G1S} = 0 V, I_D = 20 μA)		$V_{G2S(off)}$	−0.2	−4.0	Vdc
ON CHARACTERISTICS					
Zero-Gate-Voltage Drain Current* (V_{DS} = 15 V, V_{G2S} = 4.0 V, V_{G1S} = 0 V)		I_{DSS}*	6	30	mA
SMALL-SIGNAL CHARACTERISTICS					
Forward Transfer Admittance (V_{DS} = 15 V, V_{G2S} = 4.0 V, V_{G1S} = 0 V, f = 1.0 kHz) Note 2		$\|Y_{fs}\|$	10	22	mmhos
Input Capacitance (V_{DS} = 15 V, V_{G2S} = 4.0 V, I_D = I_{DSS}, f = 1.0 Mhz)		C_{iss}	Typ. 3.0		pF
Reverse Transfer Capacitance (V_{DS} = 15 V, V_{G2S} = 4.0 V, I_D = 10 mA, f = 1.0 MHz)		C_{rss}	0.005	0.03	pF
Output Capacitance (V_{DS} = 15 V, V_{G2S} = 4.0 V, I_D = I_{DSS}, f = 1.0 MHz)		C_{oss}	Typ. 1.4		pF
FUNCTIONAL CHARACTERISTICS					
Noise Figure		NF			dB
(V_{DD} = 18 V, V_{GG} = 7.0 V, f = 200 MHz)	3N204		—	3.5	
(V_{DS} = 15 V, V_{G2S} = 4.0 V, I_D = 10 mA, f = 450 MHz)	3N204		—	5.0	
Common Source Power Gain		G_{ps}			dB
(V_{DD} = 18 V, V_{GG} = 7.0 V, f = 200 MHz)	3N204		20	28	
(V_{DS} = 15 V, V_{G2S} = 4.0 V, I_D = 10 mA, f = 450 MHz)	3N204		14	—	

ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
Bandwidth (V_{DD} = 18 V, V_{GG} = 7.0 V, f = 200 MHz) (V_{DD} = 18 V, f_{LO} = 245 MHz, f_{RF} = 200 MHz) (Note 4)	 3N3204 3N205	BW	 7.0 4.0	 12 7.0	MHz
Gain Control Gate-Supply Voltage (Note 3) (V_{DD} = 18 V, ΔGPS = 300 dB, f = 200 MHz)	 3N204	$V_{GG(GC)}$	0	−2.0	Vdc
Conversion Gain (Note 4) (V_{DD} = 18 V, f_{LO} = 245 MHz, f_{RF} = 200 MHz)	 3N205	$G_{(conv.)}$	17	28	dB

*PW = 30 μs, Duty Cycle ≤ 2.0%.

(1) All gate breakdown voltages are measured while the device is conducting rated gate current. This insures that the gate voltage limiting network is functioning properly.

(2) This parameter must be measured with bias voltages applied for less than five (5) seconds to avoid overheating.

(3) ΔG_{ps} is defined as the change in G_{ps} from the value at V_{GG} = 7.0 V.

(4) Amplitude at input from local oscillator is 3 volts RMS.